ARCHIVES OF

Biochemistry and Biophysics

Volume 306
1993

ACADEMIC PRESS, INC.
Harcourt Brace & Company
San Diego New York Boston
London Sydney Tokyo Toronto

Copyright © 1993 by Academic Press, Inc.

All Rights Reserved

No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without permission in writing from the copyright owner.

The appearance of the code at the bottom of the first page of an article in this journal indicates the copyright owner's consent that copies of the article may be made for personal or internal use, or for the personal or internal use of specific clients. This consent is given on the condition, however, that the copier pay the stated per copy fee through the Copyright Clearance Center, Inc. (27 Congress Street, Salem, Massachusetts 01970), for copying beyond that permitted by Sections 107 or 108 of the U. S. Copyright Law. This consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale. Copy fees for pre-1993 articles are as shown on the article title pages; if no fee code appears on the title page, the copy fee is the same as for current articles.

0003-9861/93 $5.00

MADE IN THE UNITED STATES OF AMERICA

This journal is printed on acid-free paper.

CONTENTS OF VOLUME 306

Number 1, October 1993

PERSPECTIVES IN BIOCHEMISTRY AND BIOPHYSICS

Biosynthesis of the Plant Photoreceptor Phytochrome
Matthew J. Terry, Jill A. Wahleithner, and J. Clark Lagarias 1

COMMUNICATION

Brain Hexokinase and Intramitochondrial Compartments of ATP: Fact and Artifact
Fanny Laterveer, Klaas Nicolay, Hector BeltrandelRio, and John E. Wilson 285

BIOLOGICAL OXIDATIONS AND P450 REACTIONS

Antioxidant Defenses of Baker's Yeast against Free Radicals and Lipid Peroxides in Rat Brain
Librado A. Santiago and Akitane Mori 16

Relationship between Lipid Peroxidation, Fatty Acid Composition, and Ascorbic Acid in the Liver during Carbohydrate and Caloric Restriction in Mice *Caridad Rojas, Susana Cadenas, Rosa Pérez-Campo, Mónica López-Torres, Reinaldo Pamplona, Juan Prat, and Gustavo Barja* 59

Accumulation of the Nuclear Dioxin (Ah) Receptor and Transcriptional Activation of the Mouse *Cyp1a-1* and *Cyp1a-2* Genes *Usha R. Pendurthi, Steven T. Okino, and Robert H. Tukey* 65

Reductive Activity of a Manganese-Dependent Peroxidase from *Phanerochaete chrysosporium*
Namhyun Chung, Manish M. Shah, Thomas A. Grover, and Steven D. Aust 70

Effects of Oxygen and Antioxidants on the Mitochondrial Ca-Retention Capacity
René Guidoux, Pierre Lambelet, and Joanne Phoenix 139

Methylation of RNA Purine Bases by Methyl Radicals
Jae O. Kang, Kathleen S. Gallagher, and Gerald Cohen 178

A Diffusion-Controlled Step in the Catalytic Cycle of Nitrous Oxide Reductase from *Wolinella succinogenes*
Chengeto Mukonoweshuro and Thomas C. Hollocher 195

Cytosolic Protein Phosphatase May Turn Off Activated NADPH Oxidase in Guinea Pig Neutrophils
Masafumi Yamaguchi, Jun-Ichi Sasaki, Maki Kuwana, Masaru Sakai, Naoki Okamura, and Sadahiko Ishibashi 209

Amino Acid Sequence of a High Redox Potential Ferredoxin (HiPIP) from the Purple Phototrophic Bacterium *Rhodopila globiformis,* Which Has the Highest Known Redox Potential of Its Class
R. P. Ambler, T. E. Meyer, and M. D. Kamen 215

6-Substituted 3,4-Benzocoumarins: A New Structural Class of Inducers and Inhibitors of CYP1A1-Dependent Activity *H. Liu, M. Santostefano, Y. Lu, and S. Safe* 223

Isolation and Characterization of Human Liver Cytochrome P450 2C19: Correlation between 2C19 and *S*-Mephenytoin 4′-Hydroxylation
Steven A. Wrighton, Jeffrey C. Stevens, Gerald W. Becker, and Mark VandenBranden 240

Free Radical Scavenging Action of Baicalein
Hajime Hamada, Midori Hiramatsu, Rei Edamatsu, and Akitane Mori 261

Studies on the Inhibition of Collagen Synthesis in Fibroblasts Treated with Paraquat
Douglas Darr, Susan Combs, Saood Murad, and Sheldon Pinnell 267

BIOPHYSICAL CHEMISTRY AND X-RAY CRYSTALLOGRAPHY

The State of the Copper Sites in Human Ceruloplasmin
Giovanni Musci, Maria Carmela Bonaccorsi di Patti, and Lilia Calabrese 111

ENZYME STRUCTURE AND MECHANISMS; CELLULAR REGULATION; PHOSPHORYLATION AND DEPHOSPHORYLATION

Effects of Diabetes on the Activity and Content of the Branched-Chain α-Ketoacid Dehydrogenase Complex in Liver *Reid Gibson, Yu Zhao, Jerzy Jaskiewicz, S. Edwin Fineberg, and Robert A. Harris* 22

Multiple Attack Mechanism in the Porcine Pancreatic α-Amylase Hydrolysis of Amylose and Amylopectin *Alexey K. Mazur and Hiroshi Nakatani* 29

Inhibition of Actin Stimulation of Skeletal Muscle (A1)S-1 ATPase Activity by Caldesmon *Mark E. Hemric, Michael V. Freedman, and Joseph M. Chalovich* 39

Inhibition of Spinach D-Glyceraldehyde 3-Phosphate: $NADP^+$ Oxidoreductase (Nonphosphorylating) by Adenylate Compounds: The Effect of Dead-End Inhibitors on a Steady State Random Reaction Mechanism *Paolo Trost and Paolo Pupillo* 76

Characterization of α-Glucosidases from Rainbow Trout Liver *Hossein Mehrani and Kenneth B. Storey* 188

Regulation of the Activity and Phosphorylation of the Plasma Membrane Ca^{2+}-ATPase by Protein Kinase C in Intact Human Erythrocytes *Lesley C. Wright, Shi Chen, and Basil D. Roufogalis* 277

GENE EXPRESSION, TRANSCRIPTION, AND TRANSLATION

Prostaglandin G/H Synthase Isoenzyme 2 Expression in Fibroblasts: Regulation by Dexamethasone, Mitogens, and Oncogenes *Gary E. Evett, Weilin Xie, Jeffrey G. Chipman, Donald L. Robertson, and Daniel L. Simmons* 169

LIPIDS, LIPID MEDIATORS, AND GLYCOLIPIDS

Inactivation of Peptidoleukotrienes in the Isolated Perfused Rat Lung *Jay Y. Westcott, Sadafumi Ono, Masahiko Oka, Ken Jones, and Norbert F. Voelkel* 44

Serum and Glucocorticoid Regulation of Gene Transcription and Expression of the Prostaglandin H Synthase-1 and Prostaglandin H Synthase-2 Isozymes *David L. DeWitt and Elizabeth A. Meade* 94

MEMBRANE PROTEINS AND TRANSPORT; INTRACELLULAR SIGNALS; CYTOKINES AND RECEPTORS

Effects of Diacylglycerol on the Activation and Kinetics of the Respiratory Burst Oxidase in a Cell-Free System from Human Neutrophils: Evidence That Diacylglycerol May Regulate Nucleotide Uptake by a GTP-Binding Protein *Jeen-Woo Park and Bernard M. Babior* 119

Dimer- and Oligomerization of the Erythropoietin Receptor by Disulfide Bond Formation and Significance of the Region near the WSXWS Motif in Intracellular Transport *Osamu Miura and James N. Ihle* 200

Spermine Inhibition of the Permeability Transition of Isolated Rat Liver Mitochondria: An Investigation of Mechanism *Rena G. Lapidus and Patricia M. Sokolove* 246

Characterization of the Plasmalemma ATPase from the Cyanobacteria *Synechococcus* PCC 6311 and PCC 7942 *Chantal Fresneau, Marie-Emmanuel Rivière, and Bernard Arrio* 254

PLANT BIOCHEMISTRY AND MOLECULAR BIOLOGY

Conversion of Chlorophyll *b* to Chlorophyll *a* by Isolated Cucumber Etioplasts *Hisashi Ito, Yoshito Tanaka, Hideo Tsuji, and Ayumi Tanaka* 148

An Engineered Change in the L-Malate Sensitivity of a Site-Directed Mutant of Sorghum Phospho*enol*pyruvate Carboxylase: The Effect of Sequential Mutagenesis and S-Carboxymethylation at Position 8 *Stephen M. G. Duff, Loïc Lepiniec, Claude Crétin, Carlos S. Andreo, Shirley A. Condon, Gautam Sarath, Jean Vidal, Pierre Gadal, and Raymond Chollet* 272

PROTEIN STRUCTURE AND FUNCTION; PROTEASES, PROTEIN TURNOVER, AND POST-TRANSLATIONAL PROCESSING

Cancer Cachexia, Malnutrition, and Tissue Protein Turnover in Experimental Animals
Luciana Tessitore, Paola Costelli, Giovanni Bonetti, and Francesco M. Baccino 52

Amino Acid Sequences of Cytochromes c-551 from the Halophilic Purple Phototrophic Bacteria, *Ectothiorhodospira halophila* and *E. halochloris* *R. P. Ambler, T. E. Meyer, and M. D. Kamen* 83

Processing and Transport of the Precursor of Cathepsin C during Its Transfer into Lysosomes
Daisaku Muno, Kazumi Ishidoh, Takashi Ueno, and Eiki Kominami 103

Release of Carcinoembryonic Antigen from Human Tumor Cells by Phosphatidylinositol-Specific Phospholipase C: Highly Effective Extraction and Upregulation from LS-174T Colonic Adenocarcinoma Cells
Edouard Gouin, Michelle Ouary, Sylvie Pogu, and Pierre Saï 125

Interaction of Ant-ATP with Tubulin: Evidence for ATP Competition for the GTP E-Site on Tubulin
Sadananda S. Rai and Sitapati R. Kasturi 133

Purification and Enzymatic Characterization of the Geranylgeranyl Pyrophosphate Synthase from *Erwinia uredovora* after Expression in *Escherichia coli*
Michael Wiedemann, Norihiko Misawa, and Gerhard Sandmann 152

Interaction of Heme with Amphiphilic Peptides: Use of Hemin-CN to Probe the Interaction of Calmodulin with Its Target Peptides *Estelle Leclerc, Liliane Leclerc, Claude Poyart, and Michael C. Marden* 158

Heme Binding to Calmodulin, Troponin C, and Parvalbumin, as a Probe of Calcium-Dependent Conformational Changes *Estelle Leclerc, Liliane Leclerc, Robert Cassoly, Elizabeth der Terrossian, Henri Wajcman, Claude Poyart, and Michael C. Marden* 163

Renaturation of Lysozyme—Temperature Dependence of Renaturation Rate, Renaturation Yield, and Aggregation: Identification of Hydrophobic Folding Intermediates
Bernhard Fischer, Ian Sumner, and Peter Goodenough 183

Molecular Cloning, Sequencing, and Analysis of the cDNA for Rabbit Muscle Glycogen Debranching Enzyme
Wei Liu, M. Liza de Castro, Jemmy Takrama, Peter T. Bilous, Thuraiayah Vinayagamoorthy, Neil B. Madsen, and R. Chris Bleackley 232

Number 2, November 1, 1993

INVITED PAPER

The Concept of Energy-Rich Phosphate Compounds: Water, Transport ATPases, and Entropic Energy
Leopoldo de Meis 287

BIOLOGICAL OXIDATIONS AND P450 REACTIONS

α-Tocopherol Interacts with Natural Micelle-Forming Single-Chain Phospholipids Stabilizing the Bilayer Phase
Josefa Salgado, José Villalaín, and Juan C. Gómez-Fernández 368

Cobalt(II) and Nickel(II) Ions as Promoters of Free Radicals *in Vivo:* Detected Directly Using Electron Spin Resonance Spectrometry in Circulating Blood in Rats
Xiaoyan Wang, Isao Yokoi, Jiankang Liu, and Akitane Mori 402

Excess Substrate Inhibition of Xanthine Oxidase: A Reexamination *Alfred Hausladen and Irwin Fridovich* 415

Expression of Modified Cytochrome P450 2C10 (2C9) in *Escherichia coli,* Purification, and Reconstitution of Catalytic Activity *Punam Sandhu, Takahiko Baba, and F. Peter Guengerich* 443

Genomic Cloning, Sequencing, and Analysis of the Hamster Cholesterol 7α-Hydroxylase Gene (*CYP7*)
Maurizio Crestani, Giovanni Galli, and John Y. L. Chiang 451

Effects of Paraquat on *Escherichia coli:* Sensitivity to Small Changes in pH of the Medium—A Cautionary Note
Stefan I. Liochev and Irwin Fridovich 518

Hydrophobic Side Chain Requirements for Lauric Acid and Progesterone Hydroxylation at Amino Acid 113 in Cytochrome P450 2C2, a Potential Determinant of Substrate Specificity
Petra Straub, Eric F. Johnson, and Byron Kemper 521

BIOPHYSICAL CHEMISTRY AND X-RAY CRYSTALLOGRAPHY

Electrical Conductivity of Differently Treated Isolated Cuticular Membranes by Impedance Spectroscopy
J. Ramos-Barrado, J. Benavente, and A. Heredia 337

The Role of Water in the Dissociation of Enolase, a Dimeric Enzyme
Mary Judith Kornblatt, Jack A. Kornblatt, and Gaston Hui Bon Hoa 495

^{13}C and ^{15}N Nuclear Magnetic Resonance Evidence That the Active Site Carboxyl Group of Dihydrofolate Reductase Is Not Involved in the Relay of a Proton to Substrate
Raymond L. Blakley, James R. Appleman, James H. Freisheim, and Michael J. Jablonsky 501

The Main Chain Dynamics of a Peptide Bound to Calmodulin
Carl Chen, Yiqing Feng, James H. Short, and A. Joshua Wand 510

Transient Proton Uptake and Release Is Associated with the Photocycle of the Photoactive Yellow Protein from the Purple Phototrophic Bacterium *Ectothiorhodospira halophila*
T. E. Meyer, M. A. Cusanovich, and G. Tollin 515

ENZYME STRUCTURE AND MECHANISMS; CELLULAR REGULATION; PHOSPHORYLATION AND DEPHOSPHORYLATION

Secondary Substrate Binding in Aspartic Proteinases: Contributions of Subsites S_3 and S_2' to k_{cat}
Mahmoud Balbaa, Annie Cunningham, and Theo Hofmann 297

A New, Sensitive Fluorogenic Substrate for Papain Based on the Sequence of the Cystatin Inhibitory Site
Francis Gauthier, Thierry Moreau, Gilles Lalmanach, Michèle Brillard-Bourdet, Michèle Ferrer-Di Martino, and Luiz Juliano 304

Manganese(II) Activation of 3-Phosphoglycerate Mutase of *Bacillus megaterium:* pH-Sensitive Interconversion of Active and Inactive Forms
Nicholas J. Kuhn, Barbara Setlow, and Peter Setlow 342

Direct Photoaffinity Labeling of Rat Liver Carbamoyl Phosphate Synthetase I with ATP
M. Daniel Potter and Susan G. Powers-Lee 377

The 85-kDa, Arachidonic Acid-Specific Phospholipase A_2 Is Expressed as an Activated Phosphoprotein in Sf9 Cells
Marianne S. de Carvalho, Francis X. McCormack, and Christina C. Leslie 534

GENE EXPRESSION, TRANSCRIPTION, AND TRANSLATION

Site-Specific Interaction of a Partially Purified Human Lens Factor(s) with Conserved Sequences of the Human Gamma Crystallin Gene
Barkur S. Shastry 476

GLYCOCONJUGATES AND OLIGOSACCHARIDES; PROTEOGLYCANS AND EXTRACELLULAR MATRICES

Evidence for a Glycosaminoglycan Chain on a Portion of Articular Cartilage Fibronectins
Nancy Burton-Wurster and George Lust 309

Purification and Characterization of a Mannose-Specific Lectin from Shallot (*Allium ascalonicum*) Bulbs
Hanqing Mo, Els J. M. Van Damme, Willy J. Peumans, and Irwin J. Goldstein 431

Substrate Specificity of the Heparin Lyases from *Flavobacterium heparinum*
Umesh R. Desai, Hui-ming Wang, and Robert J. Linhardt 461

LIPIDS, LIPID MEDIATORS, AND GLYCOLIPIDS

Identification of 5-Keto-(7E,9E,11Z,14Z)-Eicosatetraenoic Acid as a Novel Nonenzymatic Rearrangement Product of Leukotriene A_4
Jocelyn Gravel, Jean-Pierre Falgueyret, James Yergey, Laird Trimble, and Denis Riendeau 469

Purification and Immunological Analysis of Phospholipase D from Castor Bean Endosperm
Xuemin Wang, James H. Dyer, and Ling Zheng 486

MEMBRANE PROTEINS AND TRANSPORT; INTRACELLULAR SIGNALS; CYTOKINES AND RECEPTORS

Isolation of an Inhibitor for the Independent Mannose 6-Phosphate Receptor Endocytosis of Bovine β-Glucuronidase by Human Fibroblasts
Alfonso González-Noriega, Patricia Ferrera, Rocio Coutiño, and Colette Michalak 331

Modulation of Bradykinin-Induced Calcium Signals by Oxidative Stress in PC12 Cells
Holger Klyszcz-Nasko, Christiane Richter-Landsberg, and Detmar Beyersmann 383

The Mannose Receptor and the Cation-Dependent Form of Mannose 6-Phosphate Receptor Have Overlapping Cellular and Subcellular Distributions in Liver *Donald J. Messner* 391

8-Azido-adenine Nucleotides as Substrates of Ecto-nucleotidases in Chromaffin Cells: Inhibitory Effect of Photoactivation *Fernando Rodríguez-Pascual, Magdalena Torres, and M. Teresa Miras-Portugal* 420

PLANT BIOCHEMISTRY AND MOLECULAR BIOLOGY

Photosynthesis in Phospho*enol*pyruvate Carboxykinase-Type C_4 Plants: Mechanism and Regulation of C_4 Acid Decarboxylation in Bundle Sheath Cells *Nancy W. Carnal, Anthony Agostino, and Marshall D. Hatch* 360

Reversal of the Red Beet Tonoplast H^+-ATPase by a Pyrophosphate-Generated Proton Electrochemical Gradient
Arthur L. Schmidt and Donald P. Briskin 407

PROTEIN STRUCTURE AND FUNCTION; PROTEASES, PROTEIN TURNOVER, AND POST-TRANSLATIONAL PROCESSING

The Influence of Amino Acid Sequence on the Fibrillogenicity and Amyloidogenicity of the Carboxy-Terminus of β-Amyloid Precursor Protein
Claudia B. Caputo, Irene R. Evangelista Sobel, Linda A. Sygowski, Richard A. Lampe, and Russell C. Spreen 321

Covalent Dimerization of Recombinant Human Interferon-γ
Scott L. Lauren, Tsutomu Arakawa, Kendall Stoney, and Michael F. Rohde 350

Purification and Characterization of a Tripeptidyl Peptidase I from Human Osteoclastomas: Evidence for Its Role in Bone Resorption *Alison E. Page, Karen Fuller, Timothy J. Chambers, and Michael J. Warburton* 354

Interaction of the Amino-Terminus of an Influenza Virus Protein with Mitochondria
Beulah M. Woodfin and A. Latif Kazim 427

Characterization of the Rat Hemoglobin Thiyl Free Radical Formed upon Reaction with Phenylhydrazine
David J. Kelman and Ronald P. Mason 439

Heparin–von Willebrand Factor Binding as Assessed by Isothermal Titration Calorimetry and by Affinity Fractionation of Heparins Using Synthetic Peptides
Ruth Tyler-Cross, Michael Sobel, Dalila Marques, Dulce F. Soler, and Robert B. Harris 528

AUTHOR INDEX FOR VOLUME 306 541

NOTICE

The Subject Index for Volume 306 will appear in the December 1993 issue as part of a cumulative index for the year 1993.

Digitized by the Internet Archive
in 2026

https://archive.org/details/archives-of-biochemistry-and-biophysics_1993_306_contents

Archives of
BIOCHEMISTRY AND BIOPHYSICS

INSTRUCTIONS TO AUTHORS[1]

Archives of BIOCHEMISTRY AND BIOPHYSICS is an international journal dedicated to the dissemination of fundamental knowledge in all areas of biochemistry and biophysics. **Research Reports** and **regular manuscripts** that contain new and significant information of general interest to workers in these fields are welcome. Sufficient detail must be included to enable others to repeat the work.

Research Reports provide a mechanism for rapid publication of short but complete manuscripts on outstanding and novel research findings. They should consist of 1000 or fewer words of text and a total of six or fewer figures and tables. The first paragraph should describe, without abbreviations, the background, rationale, principal findings, and conclusions of the study. Experimental methods should be reported in the table or figure legends, not in the text. Acknowledgments may be included in a footnote to the title. Omit the abstract and text subheadings, and keep literature citations to a reasonable minimum. The scientific quality of these reports should be of the highest caliber to facilitate rapid review. Authors should identify the manuscript as a Research Report and submit it directly to the Editorial Office of the journal (see below).

Accelerated status may also be given to those manuscripts that are reviewed as outstanding and that require little or no revision. At submission, authors may request accelerated publication of their manuscript. To expedite publication of such articles, authors will not receive proofs.

Manuscripts should be written in clear, concise, and grammatical English and should be submitted in quadruplicate (one original and three photocopies), including four sets of original figures or good quality glossy prints, to:

Archives of BIOCHEMISTRY AND BIOPHYSICS
Editorial Office, Third Floor, 1250 Sixth Avenue
San Diego, California 92101

Failure to receive the required number of copies of the manuscript may delay review. All copies of halftone artwork *must* be glossy prints or originals; photocopies of halftones do not show sufficient detail to be used for the review process. *In the case of rejected manuscripts only one copy of the manuscript will be returned to the author.*

For nucleotide sequence data authors are encouraged to submit original nucleotide or amino acid sequence data to a databank such as GenBank or EMBL. A footnote that includes the accession number should be included on the title page. It is preferable that the sequence data be deposited either prior to submission or by the time of acceptance of the manuscript. However, a footnote can be added at the proof stage if the material is deposited after acceptance. For further information please contact the editorial office or GenBank or EMBL directly.

Policy regarding publication of experiments on unanesthetized animals conforms with the standards for use of laboratory animals established by the Institute of Laboratory Animal Resources, U.S. National Academy of Sciences. Experiments in which curariform agents are used must be justified and details of the steps taken to reduce or avoid distress to the animal must be provided, particularly with regard to electrical stimulation.

Original papers only will be considered. ***Manuscripts are accepted for review with the understanding that the same work has not been published, that it is not under consideration for publication elsewhere, and that its submission for publication has been approved by all of the authors and by the institution where the work was carried out. It is the responsibility of the corresponding author to obtain the agreement of all the coauthors of the manuscript prior to its submission to the journal.*** Abstracts of oral or poster presentations are not considered to constitute previous publication. Presentation of material in preliminary communications normally will not preclude publication of a full paper in **Archives**, provided that the full paper contains additional information that justifies its publication and does not repeat the presentation of the same data that supported the preliminary communication. The manuscript should be accompanied by copies of all preliminary communications and of all relevant manuscripts that are in press or under editorial consideration by another journal. Authors must verify the wording of any cited personal communication with the persons who supplied the information and obtain approval for the use of their names in connection with the quoted information or for the citation of unpublished work; written evidence of such approval should accompany the manuscript. All material published in **Archives** represents the opinions of the authors and should not be construed to reflect the opinions of the Editors or the Publisher.

Authors should suggest competent reviewers in their field and may also suggest individuals whom they wish to have excluded from the review process. The corresponding author will receive a decision letter from the Executive Editor. Revised manuscripts and correspondence concerning such manuscripts should be sent to the Executive Editor at the address indicated on the decision letter. Revised manuscripts should be accompanied by a copy of the unrevised version.

Many acceptable papers require minor revision or condensation. It is in the mutual interest of both the authors and the journal that amended manuscripts be returned promptly. A revised paper will retain its original date of receipt only if it is received by the Executive Editor within 2 months of the date of return to the author.

Authors submitting a manuscript do so on the understanding that if it is accepted for publication, copyright in the article, including the right to reproduce the article in all forms and media, shall be assigned exclusively to the Publisher. The Publisher will not refuse any reasonable request by the author for permission to reproduce any of his or her contributions to the journal.

[1] An extended Instructions to Authors is published in the January issue of **Archives of BIOCHEMISTRY AND BIOPHYSICS**. Reprints are available from the Editorial Office upon request. Authors should consult the extended Instructions for details on nomenclature, IUPAC–IUBMB rules and recommendations, and accepted abbreviations.

Form of manuscript. Manuscripts should be typewritten and double-spaced throughout on one side of $8\frac{1}{2} \times 11$-in. white paper, with 1-in. margins on all sides. All pages should be numbered consecutively.

Subject Areas. Authors should specify on page 1 of the manuscript the Subject Area of the article submitted:

Biological Oxidations and P450 Reactions
Glycoconjugates and Oligosaccharides; Proteoglycans and Extracellular Matrices
Lipids, Lipid Mediators, and Glycolipids
Biophysical Chemistry and X-Ray Crystallography
Membrane Proteins and Transport; Intracellular Signals; Cytokines and Receptors
Enzyme Structure and Mechanisms; Cellular Regulation; Phosphorylation and Dephosphorylation
Plant Biochemistry and Molecular Biology
Protein Structure and Function; Proteases, Protein Turnover, and Post-translational Processing
Gene Expression, Transcription, and Translation

Page 1 should contain the article title, author(s), affiliation(s), a short running title (abbreviated form of title) of less than 65 characters including letters and spaces, the appropriate subject category for listing in the Table of Contents, suggestions for index list entries, and the name, complete mailing address, and telephone and fax numbers of the person to whom correspondence should be sent.

Page 2 should contain a short abstract of 50–250 words.

Editorial style should conform to the *Handbook for Authors* (American Chemical Society).

Footnotes to the text should be identified by superscript Arabic numerals and should be typed double-spaced on a separate sheet: footnotes to tables should be identified by superscript lowercase italic letters (^{a,b}, etc.) and placed at the bottom of the table.

Tables should be numbered with Roman numerals and cited consecutively in the text. Each table should be titled and typed double-spaced on a separate sheet. Units must be clearly indicated for each of the entries in the table.

Authors can submit complex tables and mathematical material as camera-ready copy. In this way, they are spared multiple, tedious proofreadings and the chance of error is reduced. Tables submitted as camera-ready copy should be typed single-spaced whenever possible and preferably submitted as 5×7-in. glossy prints.

Figures should be cited consecutively in the text by Arabic numerals. Legends should be typed double-spaced on a separate sheet. All figures and illustrations are to be submitted in such form as to permit photographic reproduction without retouching or redrawing. They should be planned to fit the proportion of the printed page ($7\frac{1}{8} \times 9$ in.; column width, $3\frac{1}{2}$ in.) and submitted no larger than $8\frac{1}{2} \times 11$ in. Lettering on drawings should be of professional quality or generated by *high-resolution* computer graphics and should be large enough (10–12 points) to take a reduction of 50–60%. Drawings should be made with black India ink on tracing linen, smooth-surface white paper, or Bristol board. Alternatively, *high-quality* computer graphics may be acceptable. Graph paper, if used, should be ruled in blue. Glossy prints of figures properly prepared are acceptable. Illustrations in color can be accepted only if the authors defray the cost.

Cover photographs. Suggestions for *cover photographs* are welcome. Submit them as slides with $8\frac{1}{2} \times 11$-in. color or black-and-white prints to accompany specific articles. A short (one-line) legend should accompany each photograph.

References should be cited in the text by an Arabic numeral in parentheses and listed at the end of the paper in numerical order typed double-spaced on a separate sheet. Abbreviations of journal titles should conform to those of the most recent edition of *Chemical Abstracts Service Source Index.* Please note the following examples.

1. Gemzik, B., Green, J., and Parkinson, A. (1992) *Arch. Biochem. Biophys.* **296,** 355–365.
2. Stein, W. D. (1986) Transport and Diffusion across Cell Membranes, Academic Press, San Diego.
3. Compton, T. (1990) *in* PCR Protocols: A Guide to Methods and Applications (Innis, M. A., Galfand, D. H., Sninsky, J. J., and White, T. J., Eds.), pp. 39–45, Academic Press, San Diego.

Miniprint supplements are an effective way of presenting supportive data. They are printed from plates made by photographic reduction from typed pages provided by the author. Types of data that have been published as miniprint supplements include analyses relevant to studies of amino acid or polynucleotide sequences, details of chemical syntheses, preparation of enzymes, extended statistical or mathematical discussions, and X-ray diffraction data. The miniprint supplement is published in the journal, immediately following the parent paper, and is included in the reprints. Since the miniprint supplement is produced from camera-ready copy supplied by the authors with no redaction or editorial changes it is important that the copy be letter perfect and conform to the style of the journal. *Authors will not be permitted to make changes to the miniprint supplement at the proof stage. Any changes necessary in the proof must be made as a typeset "Note added in proof."*

Proofs will be sent to the author, with a reprint order form. Authors will be charged for extensive alterations.

Reprints. Fifty reprints of each article will be provided free of charge. Additional reprints may be purchased.

Personal computer disks. Manuscripts may be submitted to **Archives of BIOCHEMISTRY AND BIOPHYSICS** on personal computer disks after the manuscript has been accepted and after all revisions have been incorporated onto the disk. Label the disk with the type of computer used, the type of software and the version number, and the disk format. All tabular material will be typeset conventionally. Art must be prepared as camera-ready copy; see the section on Figures earlier in these Instructions to Authors.

A hard copy printout of the manuscript that exactly matches the disk file must be supplied. Academic Press will not accept disks without accompanying printouts of all files on the disk. File names must clearly indicate the content of each file. The manuscript will be edited according to the style of the journal, and the proofs must be read carefully by the author. Disks that are not translatable or economical to process will not be used. The publisher reserves the right not to use the disk.

For further information on preparing the disk for typesetting conversion, please contact the publisher (Editorial Supervisor, Journal Division, Academic Press, 1250 Sixth Avenue, San Diego, California 92101; telephone: (619) 699-6415; fax: (619) 699-6800).